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Are Sectoral Outputs in Pakistan Led by Energy Consumption?

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Abstract

We investigate the relationships between energy consumption and the outputs of the main economic sectors in Pakistan, where energy shortage is a major challenge faced by the economy. It is found that services and industrial output, which make up of fourth-fifth of Pakistan gross domestic product, are not led by energy consumption in the country. Hence, the government of Pakistan could impose energy conservation measures on these two sectors with little or no adverse effect on the growth of these sectors.

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1. Introduction

A voluminous literature on the interdependency of energy consumption and output has been developed in response to the few episodes of energy crisis since the first oil shock series that occurred in the 1970s¹. In this respect, many researchers attempted to determine the causal linkages between energy consumption and output, as the direction of causality has important implications on energy conservation policies². For instance, the presence of causal relationship running from energy consumption to output would indicate that energy is a stimulus to economic growth. As such, energy conservation policies such as the Kyoto protocol might possibly retard the economic development. In contrast, when causality runs from output to energy consumption for a country it denotes a less energy-dependent economy. Therefore, energy protection or conservation policies may be implemented with little unfavourable or no adverse effects on output. Empirically, most studies obtain consistent findings that energy consumption and output are related in the long run. However, there is no consensus on whether energy consumption contributes to output or the other way round (see, for instance, Ighodaro, 2010).

Noteworthy, previous empirical focus has concentrated on analyzing the energy-output relationship using data on aggregate output. Nonetheless, Chebbi and Boujelbene (2008) and few studies have attempted to investigate sectoral outputs in the analysis of the energy-output relationship. The advantage of this form of research is that we can identify the energy-dependent sectors in a country. We adopt this approach to investigate the dependency of sectoral outputs on energy in Pakistan in the current study. The specific aim of this study is to investigate the long-run relationship and the short-run causality directions between energy consumption and the outputs of the main economic sectors in Pakistan. These sectors are the industrial, services, and agriculture sectors³.

Pakistan is experiencing a rapid growth in energy demand due to the accelerating pace of economic growth and industrialization. At present, the country is facing a critical energy shortage whereby nationwide power outages that can last for 6 to 8 hours a day frequently occur (British Broadcasting Corporation, 2010). In response to the growing energy shortage, the government of Pakistan announced the Pakistan National Energy Policy on April 22, 2010 to conserve energy.

¹ See Payne (2010) for an extensive survey on this issue.

² Bowden and Payne (2009, 2010), for instance, focus on such relationship using the U.S. data. Note that Aqeel and Butt (2001) study the causal relationship between aggregate output and with energy consumption at aggregated and disaggregated levels for Pakistan.

³ According to the Central Intelligence Agency (2011), in 2010, the services sector contributed 54.6% to Pakistan's GDP, followed by the industrial sector (23.6%) and the agricultural sector (21.8%).